



Attorney Docket No.: STRM.P-001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Westman et al.  
Serial No.: 10/605,961  
Filed: November 10, 2003  
Confirmation:  
Title: Synthesis and Evaluation of New Cyanine Dyes as Minor Groove of [Poly (dA-dT)]<sub>2</sub> Binders

**SUBMISSION OF INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Applicants request that the references listed on Substitute Form PTO-1449, which is enclosed, be made of record in the Patent Office file relating to the above-captioned application. Copies of the references are provided herewith.

No fee is believed to be due with this paper as we have not received an action on the merits. The Commissioner is authorized to charge any fees which may be due to Deposit Account Number 15-0610.

Respectfully submitted,

OPPEDAHL & LARSON LLP

Marina T. Larson, PhD , Reg. No. 32,038  
P.O. Box 5068  
Dillon, CO 80435-5068  
970-468-6600

---

**CERTIFICATE OF MAILING UNDER 37 CFR §1.8(a)**

I hereby certify that this paper and the attachments named herein are being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450 on \_\_\_\_\_

February 25, 2004

2.25.04  
Date of Signature

Lori South  
Lori South



Approved for use through 07/31/2006. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Substitute for form 1449A/PTO

(Use as many sheets as necessary)

**Complete if Known**

Application Number	10/605.961
--------------------	------------

Filing Date	11/10/2003
-------------	------------

First Named Inventor	Westman et al.
----------------------	----------------

Art Unit

Examiner Name

Attorney Docket Number	STRM.P-001
------------------------	------------

Sheet	1	of	4
-------	---	----	---

## U.S. PATENT DOCUMENTS

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. <sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kind Codes of US PTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Substitute for form 1449B/PTO		<b>Complete if Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		Application Number	10/605,961
		Filing Date	11/10/2003
		First Named Inventor	Westman et al.
		Art Unit	
		Examiner Name	
Sheet	2	of	4
		Attorney Docket Number	STRM.P-001

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		CARLSSON ET AL., Optical and photophysical properties of the oxazole yellow DNA probes YO and YOYO, J. Phys. Chem., 1994, Page(s) 10313-10321, Volume 98	
		COLSON ET AL., Electric linear dichroism as a new tool to study sequence preference in drug binding to DNA, Biophysical Chemistry, 1996, Page(s) 125-140, Volume 58	
		DELIGEORGIEV ET AL., Preparation of Intercalating Dye Thiazole Orange and Derivatives, Dyes and Pigments, 1995, Page(s) 315-322, Volume 29, Number 4	
		GURRIERI ET AL., Direct Visualization of Individual DNA Molecules by Fluorescence Microscopy: Characterization of the Factors Affecting Signal/Background and Optimization of Imaging Conditions Using YOYO, Analytical Biochemistry, 1997, Page(s) 44-53, Volume 249	
		HAUGLAND, Nucleic Acid Stains, Handbook of Fluorescent Probes and Research Chemicals, 1996, Page(s) 144-152, 6th Edition, Number 8	
		ISACSSON ET AL., Solid-phase synthesis of asymmetric cyanine dyes, Tetrahedron Letters, 2001, Page(s) 3207-3210, Volume 42	
		JORGENSEN ET AL., Interaction of Hoechst 33258 with Repeating Synthetic DNA Polymers and Natural DNA, Journal of Biomolecular Structure & Dynamics, 1988, Page(s) 1005-1023, Volume 5, Number 5	
		KAPUSCINSKI ET AL., Fluorescent complexes of DNA with DAPI 4'-diamidine-2-phenyl indole.2HCl or DCI 4',6-dicarboxyamido-2-phenyl indole, Nucleic Acids Res., 1978, Page(s) 3775-3799, Volume 5, No. 10	
		KUBISTA ET AL., Characterization of Interaction between DNA and 4',6-Diamidino-2-phenylindole by Optical Spectroscopy, Biochemistry, 1987, Page(s) 4545-4553, Volume 26	
		LARSSON ET AL., Characterization of the Binding of YO to [Poly(dA-dT)] <sub>2</sub> and [Poly (dG-dC)] <sub>2</sub> and of the Fluorescent Properties of YO and YOYO Complexed with the Polynucleotides and Double-Stranded DNA, Biopolymers, 1995, Page(s) 153-167, Vol. 36	
		LARSSON ET AL., Characterization of the Binding of the Fluorescent Dyes YO and YOYO to DNA by Polarized Light Spectroscopy, 1994, Page(s) 8459-8465, Volume 116	

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Substitute for form 1449B/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				<b>Complete if Known</b>	
				Application Number	10/605,961
				Filing Date	11/10/2003
				First Named Inventor	Westman et al.
				Art Unit	
				Examiner Name	
Sheet	3	of	4	Attorney Docket Number	STRM.P-001

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		LEE ET AL., Thiazole Orange: A New Dye for Reticulocyte Analysis, Cytometry, 1986, Page(s) 508-517, Volume 7	
		LYNG ET AL., The CD of Ligand--DNA Systems. 2. Poly (dA-dt) B-DNA, Biopolymers, 1992, Page(s) 1201-1214, Volume 32	
		MATSUZAWA ET AL., Change of the Higher Order Structure in a Giant DNA Induced by 4',6-Diamidino-2-Phenylindole as a Minor Groove Binder and Ethidium Bromide as an Intercalator, Nucleosides & Nucleotides, 1994, Page(s) 1415-1423, Volume 13, Number 6 & 7	
		MIKHEIKIN ET AL., Binding of Symmetrical Cyanine Dyes into the DNA Minor Groove, Journal of Biomolecular Structure & Dynamics, 2000, Page(s) 59-72, Volume 18, No. 1	
		MITAL ET AL., Synthesis of Some 5-Substituted 2-Aminobenzenethiols and their Conversion into Phenothiazines via Smile Rearrangement, J. Chem. Soc., 1969, Page(s) 2148-2150	
		NAIM ET AL., Studies in antiparasitic agents: Part 17 -- Synthesis of 2-acylamino-6-substituted-benzthiazoles as potential anthelmintic agents, Indian Journal of Chemistry, 1991, Page(s) 494-498, Volume 30B	
		NEIDLE, Crystallographic Insights into DNA Minor Groove Recognition by Drugs, Biopolymers, 1997, Page(s) 105-121, Volume 44	
		NETZEL ET AL., Base-Content Dependence of Emission Enhancements, Quantum Yields, and Lifetimes for Cyanine Dyes Bound to Double-Strand DNA: Photophysical Properties of Monomeric and Bichromophoric DNA Stains, J. Phys. Chem., 1995, Page(s) 17936-17947, Volume 99	
		NORDEN ET AL., Linear dichroism spectroscopy of nucleic acids, Quarterly Review of Biophysics, 1992, Page(s) 51-170, Volume 25, No. 1	
		NYGREN ET AL., The Interactions Between the Fluorescent Dye Thiazole Orange and DNA, Biopolymers, 1998, Page(s) 39-51, Volume 46	

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Substitute for form 1449B/PTO  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>				<b>Complete if Known</b>	
				Application Number	10/605,961
				Filing Date	11/10/2003
				First Named Inventor	Westman et al.
				Art Unit	
				Examiner Name	
Sheet	4	of	4	Attorney Docket Number	STRM.P-001

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		OGUL'CHANSKY ET AL., Interactions of cyanine dyes with nucleic acids. XXIV. Aggregation of monomethine cyanine dyes in presence of DNA and its manifestation in absorption and fluorescence spectra, Spectrochimica Acta - Part A, 2001, Page(s) 1525-1532, Volume 57	
		PETTY ET AL., Thermodynamic Characterization of the Association of Cyanine Dyes with DNA, J. Phys. Chem. B, 2000, Page(s) 7221-7227, Volume 104	
		RYE ET AL., Stable fluorescent complexes of double-stranded DNA with bis-intercalating asymmetric cyanine dyes: properties and applications, Nucleic Acids Res., 1992, Page(s) 2803-2812, Volume 20, Number 11	
		SEIFERT ET AL., Spontaneous Assembly of Helical Cyanine Dye Aggregates on DNA Nanotemplates, J. Am. Chem. Soc., 1999, Page(s) 2987-2995, Volume 121	
		SINGER ET AL., Characterization of PicoGreen Reagent and Development of a Fluorescence-Based Solution Assay for Double-Stranded DNA Quantitation, Analytical Biochemistry, 1997, Page(s) 228-238, Volume 249	
		SVANVIK ET AL., Light-Up Probes: Thiazole Orange-Conjugated Peptide Nucleic Acid for Detection of Target Nucleic Acid in Homogeneous Solution, Analytical Biochemistry, 2000, Page(s) 26-35, Volume 281	
		WILSON ET AL., Binding of 4',6-Diamidino-2-phenylindole (DAPI) to GC and Mixed Sequences in DNA: Intercalation of a Classical Groove-Binding Molecule, J. Am. Chem. Soc., 1989, Page(s) 5008-5010, Volume 111	
		YOSHINAGA ET AL., Intercalating Fluorescence Dye YOYO-1 Prevents the Folding Transition in Giant Duplex DNA, Biochemical and Biophysical Research Communications, 2001, Page(s) 264-267, Volume 286	
		ZHOU ET AL., Blue Sensitizing Dyes: Synthesis, Spectroscopy, and Performance in Photographic Emulsions, Journal of Imaging Science and Technology, 1995, Page(s) 244-252, Volume 39, Number 3	
		ZUBAROVSKII ET AL., Asymmetric imidacarbocyanines with hetaryls as substituents, Chemical Abstracts, 1975, Page(s) 851-854, Volume 41, No. 8	Abstr

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.